Does Amniocentesis Increase the Rates of Fetal Loss and Poor Pregnancy Outcomes?

Amniosentez Fetal Kayıp ve Kötü Gebelik Sonuçlarını Artırır mı ?

Amniocentesis Results

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Özet

Amaç: Kliniğimizde son 5 yılda amniosentez yapılan hastalarda işleme bağlı fetal kayıp riskinin ve kötü gebelik sonuçlarının artıp artmadığını değerlendirmek. Gereç ve Yöntem: Bu retrospektif çalışma Kahramanmaraş Sütçü İmam Üniversitesi Tıp Fakültesi Kadın Hastalıkları ve Doğum kliniğinde 2011 Ocak ile 2015 Temmuz tarihleri arasında amniosentez yapılan 387 hastanın dosyalarından ve genetik merkezin kayıtlarından incelenerek yapıldı. Ayrıca kliniğimize kontrole gelen ve amniosentez yapılmayan düşük riskli 250 hasta kontrol grubu olarak belirlendi. Bulgular: Çalışma süresince amniosentez endikasyonu olan 688 hasta mevcuttu. Bunlardan 387 hastaya amniosentez yapıldı. %43.8 amniosentez reddetme oranı mevcuttu. En sık amniosentez endikasyonu anormal Down sendromu tarama testi iken (%57.6), 2. sıklıkla ileri maternal yaş (%22.5) görülmektedir. Amniosentez yapılan hastaların 24'ünde (%6.2) kromozomal anormallik mevcut olup bunlar içerisinde en sık Down sendromu izlendi (%54). Amniosentez sonrası fetal kayıp 2 hastada (%0.5) görülmüştür. Toplamda kötü gebelik sonuçlarına bakıldığında amniosentez yapılanlarda 8, kontrol grubunda 5 hastada kötü gebelik sonuçları izlenmiş olup gruplar arasında istatisitksel anlamlı fark yoktu (p=0.263). Tartışma: Amniosentez günümüzde sıklıkla kullanılan invaziv prenatal tanı testidir. İşleme bağlı olarak gebelik komplikasyonlarında bir artış görülmemektedir. Amniosentez öncesinde hastalara mutlaka yapılacak işlem ve sonuçları hakkında detaylı danışmanlık verilmelidir.

Anahtar Kelimeler

Amniosentez; İleri Maternal Yaş; Down Sendromu Riski

Abstract

Aim: To evaluate the risk of fetal loss and poor pregnancy outcomes associated with amniocentesis procedures on patients in our clinic in the last 5 years. Material and Method: This retrospective study was conducted by examining the hospital records and genetic centre records of 387 patients who underwent amniocentesis at the Gynaecology and Obstetrics Clinic of Kahramanmaraş Sütçü Imam University Medical Faculty between January 2011 and July 2015. A control group was formed of 250 low-risk patients who attended the clinic and did not have amniocentesis applied. Results:Throughout the study period there were 688 patients with an indication for amniocentesis. Of these, amniocentesis was applied to 387 patients and 43.8% refused the amniocentesis. The most common amniocentesis indication was the scanning test for Downs syndrome (57.6%) followed by older maternal age (22.5%). Of the patients who underwent amniocentesis, chromosomal abnormality was determined in 24 (6.2%), the most common of which was Downs syndrome (54%). Fetal loss following amniocentesis was seen in 2 patients (0.5%). When the total poor pregnancy outcomes were examined, a poor outcome was determined in 8 of the amniocentesis group and in 5 of the control group and the difference beween the 2 groups was not statistically significant (p=0.263). Discussion: Amniocentesis is an invasive prenatal test in frequent current use. No increase in pregnancy complications was observed associated with the procedure. Before the application of amniocentesis, the patient must be given detailed information about the procedure and the outcomes.

Keywords

Amniocentesis; Advanced Maternal Age; Down Syndrome Risk

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Introduction

Genetic amniocentesis is the most widely used invasive prenatal diagnostic method in obstetrics practice. However, invasive prenatal diagnostic methods such as amniocentesis may cause complications such as abortus, preterm birth and early membrane rupture [1].

Amniocentesis rates show a difference from country to country and according to different ethnic and religious groups within the same country [2]. These differences are affected by the physician's attitude and beliefs, maternal anxiety, prenatal scan results and ultrasound findings [3]. One of the most significant problems in making the decision for amniocentesis is the possibility of fetal loss. The possibility of fetal loss leads to problems in the acceptance of this procedure by both the mother and the physician. Rates of fetal loss have been reported as 0.3%-1% in different publications [4-6]. In the ACOG 2007 guidelines, fetal loss associated with amniocentesis was reported at rates of 1in 300-500 and these rates could be lower in experienced centres [7]. It has been reported in previous studies that fetal loss associated with amniocentesis occurs particularly within 4 weeks of the procedure [5].

In this study, an evaluation was made of fetal loss, especially in the first 4 weeks after primary amniocentesis, and whether or not there was an increase in other complications. A secondary objective was to identify amniocentesis indications and outcomes.

Material and Method

This retrospective study was conducted by examining the hospital records and genetic centre records of patients who underwent amniocentesis at the Gynaecology and Obstetrics Clinic of Kahramanmaraş Sütçü Imam University Medical Faculty between January 2011 and July 2015.

All the patients who underwent amniocentesis were included in the study; there were no exclusion criteria. During the study period, amniocentesis was recommended for 688 patients. Of these, amniocentesis was applied to 387 patients and 301 patients refused the procedure.

A control group was formed of patients attending the hospital for routine pregnancy check-ups who had no additional problems. The amniocentesis procedure was applied with the free-hand technique under ultrasound guidance by a perinatology specialist, a gynaecology and obstetrics specialist and a 4th year assistant. Using a 20-22 gauge spinal needle, the widest part of the amniotic sac was entered, which was not the fetal part or the umbilical cord. To prevent contamination of red blood cells, transplacental punction was avoided. After entering the amniotic cavity, the first 1 mL amniotic fluid was discarded to prevent maternal contamination and then 20 mL amniotic fluid was withdrawn for cytogenic examination. Following the procedure, the patients were kept under observation for 30-60 minutes and patients with no complications were discharged. All the patients were told to return to the hospital immediately if they experienced fever, bleeding or discharge of amniotic fluid.

In the patient group where amniocentesis was applied, the indications for amniocentesis, the results of amniocentesis and fetal loss rates were determined. A comparison was made of the pregnancy outcomes of the 2 groups where amniocentesis was and was not applied.

A statistical analysis of all data was performed using SPSS program, t test and Fisher's exact test. A value of $p<0.05$ was considered statistically significant.

Results

Throughout the study period, the records were accessed of 387 patients who had amniocentesis applied. The mean age of those patients was 31.4±4.1 years and the mean gestation week was 18.3±1.2 weeks at the time of the procedure. The most common indications for amniocentesis were the Downs syndrome scanning test (57.6%) and advanced maternal age (22.5%) (Table 1).

Table 1. Amniocentesis indications

Indication	Number (%)
Abnormal Downs Syndrome scan test	223 (57.6)
Older maternal age	87 (22.5)
Abnormal fetal sonography	58 (15.0)
History of child with chromosomal anomaly	11 (2.8)
Maternal anxiety	8 (2.1)
Total	387 (100)

In 4 (1%) patients where amniocentesis was applied, the culture was reported as insufficient and amniocentesis was applied again to these patients. Trisome 21 was determined in 13 patients, trisome 18 in 3, trisome 13 in 2, Turner syndrome in 3, 46 XX/XY mosaicism in 3 and 46X14ps(+) in 1 (Table 2).

Table 2. Distribution of genetic abnormalities

Chromosome structure	number (%)
Trisome 21	13 (54.0)
Trisome 18	3 (12.5)
Trisome 13	2 (8.4)
Turnersyndrome	3 (12.5)
46 XX/XY mosaicism	2 (8.4)
46 X14 ps (+)	1 (4.2)
Total	24 (100)

Chromasomal abnormalities were determined in a total of 24 (6.2%) patients. The mothers wished to continue the pregnancy in 2 cases of trisome 21, 1 case of trisome 13 and 1 case of Turner syndrome but in the other cases, the pregnancy was terminated.

From the total of 387 patients to whom amniocentesis was applied, 1 patient presented at the Emergency Department 12 hours after the procedure because of pain and bleeding and spontaneous abortion occurred. In 1 patient, intrauterine death of the fetus was determined 1 week after the procedure at the follow-up examination. In the first 4 weeks after amniocentesis, acute period complications were 2 (0.5%) fetal losses. Of the total 387 patients, 216 attended our hospital for routine follow-up examinations and of these, intrauterine fetal death was determined in 1 patient at 25 weeks gestation and in 1 patient at 28 weeks, where the amniocentesis result had shown trisome 21. In 3 patients, preterm birth was at 29, 32 and 34 weeks and in 1 patient, placental abruption developed in the

29th week. Anhydramnios was determined in 1 patient at 38 weeks and in 1 patient at 39 weeks (Table 3). In total, poor

Table 3. Fetal outcomes following amniocentesis

Pregnancy outcome	Fetus No	Explanation
Unknown	171	Patients did not attend follow-up appointments
Normal live birth	180 (83.3%)	
Pregnancy termination	27 (12.5%)	20 (chromosomal anomalies)
		7 (major structural anomaly)
Premature birth	2 (0.9%)	1 (placental abruption)
		1 (preterm labour)
Neonatal death	3 (1.4%)	1 (prematurity-related)
		2 (major structural anomaly)
Spontaneous abortion, intrauterine death	4 (1.9%)	2 (within the first 4 weeks after the procedure)
		2 (3rd trimester)

Note: Percentages were calculated after removing the patients who did not attend the follow-up examination appointments

pregnancy outcomes were determined in 8 patients of the amniocentesis group and in 5 of the control group. No statistcally significant difference was determined between the groups (p=0.263) (Table 4).

Table 4. Pregnancy outcomes of both groups

Pregnancy outcomes	Amniocentesis group (n= 216)	Control group (n= 250)	p
Fetal loss (16-24 weeks gestation)	2	1	
Fetal loss (24-28 weeks gestation)	2	0	
Pretem birth (28-36 weeks gestation)	2	3	
Oligo-anhydramnios	2	1	
Total	8	5	0.263

Discussion

In the decision of whether or not to apply amniocentesis, the most important question for both physician and patient is pregnancy loss associated with the procedure. In addition, complications have been reported such as fetal injury, infection, rectus muscle haematoma and amniotic fluid leakage [8,9]. In previous studies, pregnancy losses within 4 weeks of amniocentesis have been accepted as associated with the procedure. In a randomised, controlled study by Tabor et al, the rate of fetal loss was determined as 1.7% in patients who had undergone amniocentesis and as 0.7% in the low-risk group who had not undergone amniocentesis [10]. However, in later studies the rates of fetal loss associated with amniocentesis were reported as 0.06%-0.8% [11]. The reduction in the rates of fetal loss associated with amniocentesis over the years can be considered to be due to the more widespread use of ultrasound with high resolution probes and the increasing experience of those implementing the procedure [12,13]. In the current study, fetal loss within 4 weeks of amniocentesis was seen in 2 (0.5%) patients, which was consistent with literature.

Studies in literature have evaluated whether or not there is an increased of fetal loss following amniocentesis compared to normal pregnancies. In a previous case-controlled study comparing fetal losses within 4 weeks in patients who had and had not undergone amniocentesis, no statistically significant difference was seen [14,15]. In the current study, no statistically significant difference was determined between patients who had undergone amniocentesis or not in terms of fetal loss in the first 4 weeks.

Unwanted events including fetal death after 4 weeks have also been evaluated as poor pregnancy outcomes in studies examining the effect of amniocentesis on poor pregnancy outcomes. In a case-controlled study by Müngen et al, which examined 2068 cases who had undergone amniocentesis, no difference was determined between the study group and the control group in respect of intrauterine fetal death and stillbirths. In the same study, early membrane rupture was determined in only 2 cases [14]. In another similar case-controlled study, Tongsong et al compared cases who had and had not undergone amniocentesis, no statistically significant difference was determined between the groups in respect of fetal loss, placental abruption or premature birth [16].

In a study by Müler et al, there was reported to be a statistically significantly higher rate of premature birth at 24-28 weeks in the group that had undergone amniocentesis compared to the control group [15]. In the current study, no significant difference was observed between those who had or had not undergone amniocentesis in repect of poor pregnancy outcomes. These results are consistent with the majority in the literature of recent years. Therefore, in patients with indications for amniocentesis, there should be no hesitation in the application of the procedure. However, detailed information about the procedure and the outcomes must be given to the patient before application.

In previous studies, older maternal age is seen to be an indication for amniocentesis [13]. An age of 35 years and above has been accepted as older maternal age. In a study where only mothers aged over 35 years were evaluated, infants born with Down's syndrome could be determined at 30% [12]. Therefore, over time the most common indication for amniocentesis has come to be an abnormal prenatal scanning test. In the current study, the most common indication for the application of amniocentesis was Down's syndrome scanning test (57.6%), followed by older maternal age (22.5%). Although in previous years older maternal age was not used as an indication for amniocentesis in our clinic, in recent years older maternal age alone has come into use as an indication.

Another problem seen in the application of amniocentesis is the refusal of some patients to have the procedure. The most important reason for this is the possibility of termination due to a fetal disorder which cannot be treated. Due to their religious beliefs, some patients will not have amniocentesis as they do not want to have the possibility of termination.This patient group do not even want to have prenatal scanning tests. In the current study, after patients with abnormal scan tests were informed, the rate of refusal of amniocentesis was determined as 301/688 (43.8%). Of the 24 patients determined with abnormal karyotype, 4 (16.6%) refused pregnancy termination. This result demonstrates the importance of giving good information to patients who are to undergo amniocentesis.

In conclusion, although amniocentesis is an invasive prenatal test, the results of this study have shown that it can be used with confidence in patients with indications but it is of great

importance that patients are given detailed information about the procedure and the outcomes.

Competing interests

The authors declare that they have no competing interests.

References

1. Seth S. G, Goka T, Harbison A, Hollier L, Peterson S, Ramondetta L, Noblin S. J. Exploring the role of religiosity and spirituality in amniocentesis decision-making among Latinas. Journal of Genetic Counseling 2011;20(6):660–73.
2. Saucier J. B, Johnston D, Wicklund C. A, Robbins-Furman P, Hecht J. T, MongaM. Racial-ethnic differences in genetic amniocentesis uptake. Journal of Genetic Counseling 2005;14(3):189–95.
3. Kobelka C, Mattman A, Langlois S. An evaluation of the decision-making process regarding amniocentesis following a screen-positive maternal serum screen result. Prenatal Diagnosis 2009;29(3):514–9.
4. Leschot NJ, Veyaal M, Treffers PE. Risks of mid trimester amniocentesis: assessment in 3000 pregnancies. Br J Obstet Gynecol 1985;92(8):804-7.
5. Anuwutnavin S, Chanprapaph P, Ruangvutilert P, Eammatta M, Tontisirin P. Short-term out comes after second-trimester genetic amniocentesis in Siriraj Hospital. Int J Gynaecol Obstet 2014;124(3):222-5.
6. Pitukkijronnakorn S, Promsonthi P, Panburana P, Udomsubpayakul U, Chittacharoen A. Fetal loss associated with second trimester amniocentesis. Arch Gynecol Obstet 2011;284(4):93-797.
7. American College of Obstetricians and Gynecologists. ACOG Practice Bulletin No. 88, December 2007. Invasive prenatal testing for aneuploidy. Obstet Gynecol 2007;110(6):1459–67.
8. Centers for Disease Control and Prevention. Chorionic villus sampling and amniocentesis: recommendations for prenatal counselling. MMWR Recomm Rep 1995;44(RR-9):1–12.
9. Valsky DV, Daum H, Yagel S. Rectus sheath hematoma as a rare complication of genetic amniocentesis. J Ultrasound Med 2007;26(3):371–2.
10. Tabor A, Philip J, Madsen M, Bang J, Obel EB, Nørgaard-Pedersen B. Randomised controlled trial of genetic amniocentesis in 4606 low-risk women. Lancet 1986;1(8493):1287–93.
11. Kong CW, Leung TN, Leung TY, Chan LW, Sahota DS, Fung TY, et al. Risk factors for procedure-related fetal losses after mid-trimester genetic amniocentesis. Prenat Diagn 2006;26(10):925–30.
12. Tabor A, Alfirevic Z. Update on procedure-related risks for prenatal diagnosis techniques. Fetal Diagn Ther 2010;27(1):1–7.
13. Horger III EO, Finch H, Vincent VA. A single physician's experience with four thousand six hundred genetic amniocenteses. Am J Obstet Gynecol 2001;185(2):279–88.
14. Müngen E, Tütüncü L, Muhcu M, Yergök YZ. Pregnancy outcome following second trimester amniocentesis: a case–control study. Am J Perinatol 2006;23(1):25–30.
15. Muller F, Thibaud D, Poloce F, Gelineau MC, Bernard M, Brochet C, et al. Risk of amniocentesis in women screened positive for Down syndrome with second trimester maternal serum markers. Prenat Diagn 2002;22(11):1036–9.
16. Tongsong T, Wanapirak C, Sirivatanapa P, Piyamongkol W, SirichotiyakulS,Yampochai A. Amniocentesis-related fetal loss: a cohort study. Obstet Gynecol 1998;92(1):64-7.

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